Claims

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1 An imaging system (46), shown in Fig. 3, which defines an optical path therein, for capturing an image from the image-bearing radiation (38), the imaging system comprising:

a solid radiation bearing detector (40) disposed in the optical path adapted to convert the image-bearing radiation (38) into converted radiation;

a photocathode (42, 102), shown in Figs. 3 and 8 respectively, disposed within the camera housing (94) along the optical path to convert the converted radiation into a stream of electrons (116) representative of the image-bearing radiation (38);

an image amplifier (112, 114) disposed in the stream of electrons (116) such that image amplifier (112, 114) electrostatically accelerates the stream of electrons (116); and

an amplified detector (96) disposed after the image amplifier (112, 114) and, upon input of the stream of electrons (116), being adapted to generate secondary electrons to further amplify the image represented thereby such that the amplified detector (96) then converts secondary electrons into an electronic signal representative of the image.

2. A radiation imaging system (30), shown in Fig. 3, comprising

a radiation source (32) that projects radiation (35) toward an object (36),

thereby creating image-bearing radiation (38) from the object (36) toward the imaging system (46); and

an imaging system (46), which according to claim 1 has a solid

radiation bearing detector (40), shown in Fig. 4, comprising a scintillator (50) which converts the image-bearing radiation (38) into a visible light spectrum (116)

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3. The imaging system (80), shown in Fig.7, according to claim1 comprising

a solid radiation bearing detector (40), which is a flexible optic light guide system (92, 82 and 88) made of many tiny about 5 micro-meter diameter fibers, and a light source (90) thereby creating image bearing radiation (110) from the reflected light from object (84); and

a photocathode (102), shown in Figs. 7 and 8, which converts the radiation bearing light (110), reflected from object (84) and transmitted through fiber optic light guide system (92, 82 and 88), into streams of electrons (116), which can be gated according to their arrival time at the high voltage electrodes (112),

An image amplifier (112, 114) disposed in the stream of electrons (116) such that image amplifier (112, 114) electrostatically accelerates or decelerates the stream of electrons (116) according to their arrival time; and

an amplified detector (96) disposed after the image amplifier (112, 114) and, upon input of the stream of electrons (116), being adapted to generate secondary electrons to further amplify the image represented thereby such that the amplified detector (96) then converts secondary electrons into an electronic signal representative of the image.

4. The imaging system (80) according to claim 3 wherein the photocathode (102) is fabricated of gallium-arsenide, which converts the infrared radiation bearing light (110), reflected from object (84) and transmitted through fiber optic light guide system (92, 82 and 88), into streams of electrons (116), which are gated according to their arrival time at the high voltage electrodes (112), to analyze the time dependent images at detector (96), after an initial flash from the light source (90) has been emitted and reflected.

5. The imaging system (80) according to claim 3, wherein the image amplifier (112, 114) is adapted to selectively electronically magnify the image-bearing radiation (110) as measured at detector (96) and thus adjust a resolution of the image.

6. The imaging system (80) according claim 5 wherein the image amplifier (112, 114) is dynamically selectable to adjust magnification so as to govern an area of an object (84) to be imaged.

7. The imaging system (46) according to claim 2 wherein the image amplifier (112, 114) is adapted to selectively electronically de-magnify the image-bearing radiation (38) and thus adjust a resolution of the image.

8. The imaging system (46) according claim 7 wherein the image amplifier (112, 114) is dynamically selectable to adjust de-magnification so as to govern an area of an object (36) to be imaged.

9. The radiation imaging system (30), shown in Fig. 6, according to claim 2 wherein the radiation source (62) is adapted to electronically shift between a plurality of dynamically selectable positions (66,68) such that the image transmitted by the image-bearing radiation (74,76) changes for each of the plurality of positions.

10. The radiation imaging system (30) according to claim 9 wherein the radiation source (62) electronically shifts between two dynamically selectable positions (66, 68) to generate stereo pairs of three-dimensional images and to select the line-of-view of an object of interest to bypass other shadowing objects.

11. The radiation imaging system (30) according to claim 9 wherein the radiation source is continuously deflected producing a plurality of radiation shadows that can be interactively "focused" to various levels within the object (36, 84).

12. The radiation imaging system (30) according to claim 9 wherein the radiation source projects divergent rays of the radiation and has a spot size smaller than a resolution of the radiation imaging system (30).

13. The imaging system (46) according to claim 1 further comprising:

filtering means for filtering the image-bearing radiation (38) consecutively through a plurality of filters (40) thus creating a plurality of sub-images,

analysis means to distinguish between the changes of sub-images due to the filtering of the radiation and due to the object motion during and between the exposures, and

filtering means for filtering the image-bearing radiation consecutively through a plurality of wavelength filters (40) which allows only light within a preselected ranges of wavelength to pass, so that a "colored" image can be formed using these subimages of different wavelength.

analysis means to distinguish between the changes of sub-images due to the filtering of the light of different wavelength and due to the object motion during and between the exposures, and

correcting means for correcting the changes of the plurality of sub-images due to the object motion and correlating the plurality of sub-images into a color image (Fig. 10).

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